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FOREST PEST MANAGEMENT
Pacific Southwest Region

Report No. 81-21

3430 Evaluation
August 18, 1981

PSW FOREST AND RANGE EXPERIMENT STATION
AUG 28 1981
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BIOLOGICAL EVALUTION OF WHITE FIR MORTALITY IN HORTON AND DOTTA CANYONS, PLUMAS NATIONAL FOREST

Richard S. Smith, Plant Pathologist
John Wm. Dale, Entomologist

ABSTRACT

Tree mortality and pest conditions were evaluated in a young sawtimber white fir stand (Horton Canyon) and a sapling white fir stand (Dotta Canyon). The pests and stand conditions causing this mortality are described and management alternatives are identified. The insects and diseases involved were the fir engraver, twig beetles, and annosus and armillaria root diseases. The fir stands were overstocked and not well suited to the former east-side pine site.

INTRODUCTION

At the request of the Beckwourth District, John Dale, Entomologist, and Dick Smith, Pathologist, met with the District Silviculturist, Ralph Meinel, on June 30 to evaluate the white fir mortality in Horton and Dotta Canyons. These two canyons are about 7 to 8 miles due east of Lake Davis and both stands are just under 6000' in elevation.

HORTON CANYON CONDITIONS

The white fir stand examined in Horton Canyon was comprised of young sawtimber white fir with scattered ponderosa and Jeffrey pine. The stand appeared to be overstocked for the site. A survey of the old growth stumps left from past loggings indicated that the previous stand on the site was composed mainly of pine with scattered white fir. It is probable that the current fir stand was the understory at the time of logging of the pine and was released to grow and occupy the site.

USDA, FOREST SERVICE, PACIFIC SOUTHWEST REGION
State and Private Forestry, Forest Pest Management
630 Sansome Street, San Francisco, California 94111

The white fir mortality in Horton Canyon is occurring in patches or groups. This mortality has been occurring gradually over the past decade and significant holes are developing within the stand. The scattered pine are generally not affected. The pests found associated with this white fir mortality are the fir engraver, Scolytus ventralis, and annosus root disease caused by Fomes annosus.

In our assessment of this situation the white fir mortality was caused by a combination of stand and site conditions and this root disease - bark beetle complex. The white fir has been stressed over the past decades from overstocking and growing on an unsuitable site (east-side pine). Many true fir stands in California are infested with annosus root disease. Vigorous young firs are usually able to regenerate root tissues faster then they are lost to the root disease. But when the firs slow in growth because of stand and/or site conditions and decline in vigor, root development decreases to where there is a net loss in roots to the tree. The tree then enters a period of slow decline due to the gradual loss of its root system. At some point the root loss puts the tree under enough stress so that it becomes susceptible to the fir engraver. The fir engraver attacks eventually become successful and kill the weakened tree.

HORTON CANYON MANAGEMENT ALTERNATIVES

A. No Action - If no action is taken, mortality in the true fir component will continue, the pockets of dead trees will enlarge and coalesce. The fir portion of the stand will fall apart, leaving a few scattered pine with pockets of fir in the understory.

B. Salvage and Replant - Under this alternative the District could salvage the dead and dying firs and replant the openings to Jeffrey or ponderosa pine. Mortality would continue on the margins of some of the root disease openings and new root disease pockets would continue to appear in overstocked portions of the stand. The pine regeneration would not be affected by the annosus root disease now in the fir.

C. Salvage, Thin, and Replant - In this alternative the dead, dying and weakened trees in and around the root disease centers would be removed, the remaining true fir stand thinned to increase growth and vigor, and the openings created by this logging replanted to pine. Some mortality would continue to appear on the margins of the root disease centers as trees which were heavily root diseased but not identified or designated by the markers continue to die. This kind of mortality should decline over time. Some mortality would probably occur in the thinned areas for the same reasons, but this should decline as the stand growth and vigor improves. The pine regeneration should be unaffected by annosus root disease present in the firs.

D. Clearcut and Plant - In this alternative the fir stand would be clearcut and replanted to pine. The pine regeneration should not be affected by annosus root disease present in the true fir.

DOTTA CANYON CONDITIONS

An old stand of severely overstocked, sapling-size white fir was examined in Dotta Canyon. This, too, appeared to be an old pine site; this, coupled with the severe overstocking, had caused the fir stand to be very slow growing and thin-crowned.

White fir mortality was occurring in pockets within the stand. Annosus and Armillaria root diseases were found on the dead and dying fir within these pockets. Armillaria is most likely acting as a secondary under these conditions. The twig beetles Pseudohylesinus granulatus and Pityophthorus pseudotsugae were identified as part of the root disease-bark beetle complex killing the trees in pockets.

As was the case in Horton Canyon, the unsuitable site and the overstocked condition of this fir stand were major factors in the development of this pest problem.

DOTTA CANYON MANAGEMENT ALTERNATIVES

A. No Action Alternative - If no action is taken, fir mortality, particularly in and around the root disease pockets, will continue and new pockets of root disease/bark beetle mortality will most likely develop.

B. Thin - It appeared to us that this fir stand would not release if thinned; but if this action alternative were chosen, mortality around the existing root disease centers would most likely continue for a decade or so until the growth and vigor of the released fir improved to where the effects of the root disease were offset.

C. Destroy the stand and replant - In this alternative the stand would be destroyed by the most appropriate means and replanted to pine. The pine regeneration would not be affected by the annosus root disease.

INTEGRATED PEST MANAGEMENT

The fir engraver and annosus root disease are the main pest problems of concern in these stands. But other pest problems do exist or have the potential to develop under certain conditions. These should be considered in the silvicultural prescriptions developed for these stands. Pockets of dwarf mistletoe-infected ponderosa and/or Jeffrey pine are scattered thoughout Horton and Dotta Canyons. If options B, C, or D for Horton Canyon or C for Dotta Canyon are chosen, dwarf mistletoe infestations of these pines in and around the sale area and/or plantation area should be identified and removed if they are within 100 ft. of areas to be planted. Fomes annosus infestation of pine stumps, common in many eastside pine areas, leads to future plantation losses. We inspected many pine stumps left from previous loggings in Horton Canyon and found no signs of F.

annosus. From these observations we conclude that a low probability of F. annosus stump infection exists if the scattered pine within the Horton Canyon Sale area are cut under option C or D.

Forest Pest Management personnel are available if needed to help further with the problems in Horton and Dotta Canyons.